Colorado Department of Health

Comments

FINAL DRAFT

PHASE I RFI/RI WORK PLAN

ROCKY FLATS PLANT

WEST SPRAY FIELD

(Operable Unit No. 11)

JUNE 1990

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General Comments:

Standard operating procedures (SOPs) should be referenced throughout the revised document.

Figures and Tables should be placed in the body of the document, not as an appendix.

A List of Acronyms should be added.

Specific Comments:

Executive Summary: Please be specific as to what "characterization of contaminant sources and soil contamination" will entail. What actually will be investigated? For example, if the vadose zone will be characterized, this intent should be made clear (The Division believes that the vadose zone should be characterized as soon as possible to "close" the unit and abate migration into the ground water).

The last sentence on page ES-1 begins "Subsequent RFI/RI phases will focus on ground water, air, biota...". The statement should be modified to state that the Phase II RFI/RI will focus on the subject media.

Section 1.1: Please reference the IAG dated January 22, 1991.

Section 1.1.1: Referring to page 2, per the IAG Statement of Work, the closure of the unit "will" be conducted as an IM/IRA activity. An IM/IRA Decision Document (comparable to a CAD/ROD) will formalize the closure requirements.

Section 1.1.2: Per the Interagency Agreement (IAG), Attachment 2 Statement of Work (SOW), Section I. B. 11. b, Phase I RFI/RI workplans "shall implement field work designed to characterize the sources/soils of each interim status unit...". Phase II workplans are "to evaluate the nature and extent of contamination resulting from the release of hazardous substances...". To avoid confusion, please limit the use of the phrase "nature and extent" to Phase II activities. The objective of this Phase I RFI/RI, the Division believes, should be to "characterize" physical features, including soil and geology, contamination in surficial soils and the vadose zone, and provide data sufficient to support an "at the source" risk assessment. Information on the nature and extent of contamination (i. e. the transport and fate of contaminants), although a Phase II objective, may be incorporated into a Phase I RFI/RI report.

Section 1.2: Regarding the first paragraph of this section, please see the comment to the Executive Summary.

Section 2.1.1: On page 5, first paragraph, it is stated that "the location of Area 3 is not confirmed by aerial photography ... but is known from operating personnel...". Does Area 3, as shown in Figure 2-1, circumscribe the outermost reasonable boundary of the spray area given the uncertainty of the information. Please note that the Data Quality Objectives/investigative plan must recognize the relative uncertainty of such artificial boundaries.

Also, the areas believed to have been affected by runoff and windblown spray, as evidenced by aerial photography, should be mapped and presented in a figure. Although this may appear to be a Phase II issue, it would help verify that the investigation, as planned, is adequately targeting the affected areas. This is particularly true of those areas that fall within the greater West Spray Field area. (The two-foot contour interval topographic map, Plate 2-1, should be used as a base map for depicting runoff-affected areas.)

Regarding the second paragraph, page 5, what was the period of operation of fixed versus portable lines? Which operated longer? Were contaminants potentially concentrated differently based on the relative periods of operation?

Regarding the last paragraph of page 5, was the line of Area 2 always kept in one position? If not, Spray Area 2 must be enlarged.

Section 2.1.2: Regarding the first paragraph of the section, although process wastes were removed from the solar ponds in the late 1970s, slow migration of leaked water may have been collected in the French Drains and then applied at the West Spray Field between 1982-1985. This potential impact on source materials should be acknowledged by DOE and, as appropriate, factored into work plan activities.

Section 2.1.3: Regarding page 8, second paragraph, please clarify the statement that the pipeline extended "beneath" the patrol road vs the following sentence that states that the pipeline was "laid on the ground surface." A map showing the route of the pipeline, differentiating between buried vs above ground installation, would help clarify the statements. The location of the pipeline is also important to check for potential leaks that may have occurred.

Section 2.2.1: Locations of the pipelines shown on Plate 2-1 do not correspond to those shown on Figure 2-1. Are these stationary versus portable lines? The lines shown on Plate 2-1, if correct, suggest that Area 1 should be extended to the east. Please amend Area 1 if necessary.

Plate 2-1 is illegible, please supply legible maps.

Regarding the second paragraph, page 11, please locate on an appropriate map the ditches and berms constructed to the east of Area 1. To what extent did water escape the site prior to or after construction of these control features?

The discussion on topography, page 11, is very weak. The gentler eastward slopes tend to down play the rapid eastward change in geologic structure. The Division believes that the interrelationship of geologic structure and topography have not been fully considered in the determination of potentially contaminated strata. An insightful discussion, not merely acknowledgement of regional slope and the general elevation, should help foster a better understanding of site geology and potential or eventual contaminant migration. (For example, some of the numbered sandstones of the Arapahoe? and possibly the upper Laramie may be very shallow beneath the spray field.)

Section 2.2.3.1: Hurr (1976) is referenced in the first paragraph of page 13. The Hurr report was aimed at the **hydrology** of Rocky Flats. The geology sections of that report were not the main emphasis; they merely suggest the general geologic setting or context of that work. Consequently, it would be better to extract more definitive geologic information from Weimer, 1973 (referenced in Hurr) and comparable **geologic** studies.

The Division also takes exception to the Upper Laramie Formation being considered the base of the hydrologic system. Unless these claystones are prodelta muds, the potential exists for laterally

contemporaneous silts and sands that may transmit contaminants laterally and possibly, through interconnection, downward. (Weimer believes the Laramie Formation represents a delta plain depositional environment.)

Regarding paragraph 2, page 13, please locate the specific clay pits on an appropriate map. (An active clay pit is loosely identified on Plate 2-1; the specific pit and specific location in the pit need to be properly located.)

Regarding paragraph 3, page 13, the depth(s) of the upper claystone unit should be discussed in general terms. Plate 2-2 provides insight into the depths and should be referenced. **However,** Plate 2-2 contains a basic geologic error. The cross sections show the Kll (lower sandstone unit) overlaying the Klu (upper claystone unit). This is not possible unless the strata are overturned or reverse faulted. It appears that sand is labeled Kll and claystone Klu without consideration to structure. For example, both Klls of cross section A-A' are apparently sandstone but are not correlative. Both units should not be labeled Kll.

The discussion of the Arapahoe Formation beginning in the last paragraph of page 13 does not convey the Division's understanding that the upper portions of the Arapahoe Formation are missing at RFP as a result of erosion prior to the deposition of the Rocky Flats Alluvium. Reference to the upper Arapahoe should include a statement that the section has been eroded. The narrative should not be merely generic but focus on the portion of the Arapahoe Formation specific to the West Spray Field. (The discussion of the surficial and bedrock units should be sub-headed to add clarity to the format of the document, i.e. Arapahoe Formation.)

Also, regarding the last paragraph of page 13, a map showing the trace of the approximate subcrop contact of the Laramie and Arapahoe Formations is needed. The Division wishes, as should DOE, to know which bedrock formation will be encountered from west to east during drilling activities.

Regarding the last paragraph of page 14, mapping or cross-sectioning the weathered vs un-weathered contact would be much better than reciting raw data without reference to locations and the interrelationship of data. (The text goes into great detail over the depth of weathering in Well 48-86 which is considerably deeper that the other weathering described. Could this be due to fracturing or a structural feature?)

The cross sections, Plate 2-2, referenced on page 16 should be amended to reflect current interpretations of a nine degree dip. Data that would support a true cross section vs a schematic as now represented by Plate 2-2 needs to be acquired either as DQOs for this work plan or from sitewide drilling activities. This is within the RFI objective of site physical characterization.

Section 2.2.3.2: Pediment drainages have been discussed in more recent (1991) work plans as having an impact on ground water flow through the Rocky Flats Alluvium. Data are available (see Table 2-1 of the OU-6 RFI/RI Workplan) that may allow an initial mapping of these drainages pending additional data from sitewide geologic characterization and RFI/RI activities.

The thickness of the Rocky Flats Alluvium has been reported to be variable across the plant site. The Division believes that the alluvium's thickness should be discussed in respect to its site specific occurrence at the West Spray Field. Please discuss thickness trends (i. e. thickness changes west to east, north to south) and any known lithological variation of the alluvium (both vertically and laterally) at the site as determined from available data.

Section 2.3.2: Has the soil test data collected in 1986 and 1988 been validated? Will it be necessary to replace any of the data as an RFI activity?

Regarding the first paragraph, page 20, the use of the term "diameter grid", the Division suggests that this be termed a sample site or other description other than grid. **Also**, more specific information on how the random number table was actually used to select sample locations within the circular areas is needed. Were there square grids within each circular area?

Regarding the 12 test pits introduced in the second paragraph of page 20, please reference Figure 2-5.

Metals: Regarding the first paragraph of page 21, what was the basis for background in 1986? Is it consistent with any background values for mercury reported in the "Background Geochemical Characterization Report"

Also, the Division does not concur that the "random pattern of mercury concentrations in soil samples appears to be indicative of natural background variations". All of the 1988 test pits are at locations either directly or indirectly in receipt of spray water. DOE cannot, with such data, assume that mercury levels in waters were uniform or that the water was uniformly applied. Variations of mercury outside of affected areas, i. e. background, would be needed to support the DOE conclusion. (Where is the source for background mercury?) Moreover, it is inappropriate to bias the RFI/RI with such unsupported statements. Please remove the statement or qualify it by changing "appears to be indicative" to "may be indicative".

Radionuclides: Regarding the last paragraph of page 22, the Division does not concur that the 1986 buffer zone samples (Note to Table 2-3) represent plutonium background. The buffer zone locations are partially in the spray field and/or subject to

contamination from spray blown to the west. Atmospheric fallout from nuclear testing is regarded as the background source for plutonium. Please acknowledge.

Organics: Please acknowledge that organics need to be further investigated, with blanks, to evaluate whether they are actual contaminants at the site. One basic purpose of this RFI/RI is to correct data deficiencies.

Section 2.3.2.1: The reference to Figure 2-9 on page 24, first paragraph, should be to Figure 2-5.

Also, the Division does not consider the 1986 buffer zone samples to be acceptable background data to serve "as a basis for assessing potential contamination". Once again, the site was either directly or indirectly affected by spraying.

Section 3.1: The sentence that states that "... nitrate, lead, zinc and plutonium are above estimated background..." is inconsistent with the Section 2.0 discussion. The significance of above background lead concentrations in surface scrape samples, page 21, are ignored. Mercury concentrations are swept from consideration based on weak data and "Slightly elevated concentration of aluminum, chromium and zinc" are merely dropped from consideration. Under RCRA corrective action "any" levels which constitute a release are subject to cleanup. The site conceptual model must address all contaminants of concern not merely those "selected" as of appropriate concern by DOE.

Section 3.1.2: Ground water elevations presented in Figures 2-6 through 2-9 should be referenced in the second paragraph of this section. Also, these figures show little fluctuation in the water table away from sources of recharge, i. e. the steam channels. No wells in OU-11 are labeled dry, either the last sentence may be an generalization inappropriate to the West Spray Field or the figures need to be corrected.

What tests are planned to estimate the **unsaturated** hydraulic conductivity of the Rocky Flats Alluvium? Are neutron logs available, or planned, to quantify soil moisture?

Section 3.1.4: Is any thought being given to the degree that vegetative cover may diminish wind dispersion of contaminants?

Section 3.4: The IAG is specific that Phase I activities for this OU describe or characterize contamination of source and soils; therefore, DOE is not required to "thoroughly evaluate the extent of contamination" until Phase II. The Data Quality Objectives should clearly specify the content of Phase I work plan.

Regarding the goals outlined in Section 3.4, the five general goals of an RI (U. S. EPA, 1988, Guidance for Conducting Remedial

Investigations and Feasibility Studies under CERCLA Interim Final: EPA/540/G-89/004, OSWER Directive 9355.3.01, October 1988) provide a suitable framework for establishing Data Quality Objectives (DQOs). Please acknowledge these five goals as general objectives of an RFI/RI investigation but specify that nature and extent and contaminant transport and fate are Phase II RFI/RI issues as set forth in the IAG Statement of Work. The DQOs should then be clearly developed to achieve the Phase I goals of characterizing site physical features, defining contaminant sources, and to provide data for a baseline risk assessment. The data generated should also allow DOE to screen remedial alternatives. (Please see the OU-7 work plan dated August 1991.)

Section 4.0: It is stated that data needs and sampling objectives on which the sampling plan was based have been described in Section 3.4. The Division believes Section 3.4 to be insufficient to drive a detailed sampling plan. DOE must design a field program based on where expected contaminants are likely to be present at the time of sampling. For example plutonium may be expected in the surface soils while VOCs may be found deeper in the vadose zone.
In other words, the various rationales on "where to look" for contaminants within the Phase I context of sources and soils must be developed.

The West Spray Field has a specific history of waste management practice (spraying, and spray induced runoff), suspected types of contaminants (radionuclides, metals, VOCs), and physical setting (geology, topography, hydrology) that help define expected or probable exposure pathways. When this information is used to **conceptualize** how exposure may occur, it is then possible to rationally define the types of samples, screening techniques and analysis requirements that will determine contaminant concentrations along each pathway. The conceptual models presented in the work plan should be expanded to include the vadose zone and also used to identify specific sampling needs.

The Division has conducted a preliminary analysis of pathways and has identified gaps in the data needed for risk assessment. DOE must not miss this opportunity to collect all relevant data.

Following is a discussion of additional samples that must be collected to fulfill data needs.

Sediment samples should be collected from the channels that are known to have carried spray induced surface water. The potential for concentration of contaminants within the IHSS boundary is the concern. Not only may contaminants pose an added risk from direct dermal contact or ingestion, but wind bourn contaminants may be inhaled by plant workers or off-site residents. Likewise, precipitation events may drive contaminants into onsite streams and contribute contaminants to OU-5 and OU-6 and thwart cleanup efforts of those operable units.

A direct sampling of vadose water is needed to assess infiltration of contaminants. Although SOP GT.2 and FO.16 are of some value, the BAT method proposed for OU-7 should be considered, especially for characterization of the alluvium. Analysis requirements must also be envisioned and incorporated into the work plan.

Section 4.1: The five bore holes specified in the Environmental Restoration IAG Schedule, August 14, 1990, represent minimum requirements. DOE should briefly describe the scoping process and rationale for site selection as shown on Figure 4-1. For example, were sites located merely on the basis of where irrigation lines or the impulse cannon were located? Was bedrock geology (dip) and ground water movement considered in the site selection process? Do they need to be considered? Can the contaminants of concern, based upon their physical and chemical properties, be expected at the chosen sites or could they have migrated down gradient. In other words, briefly document why five holes and the chosen locations will be adequate to characterize contamination in the soil. Also, specify whether well completions are expected to be in alluvium or bedrock, or both. The locations of the holes may become more critical considering they are proposed for conversion to monitoring wells, particularly if they are completed in bedrock. (The Division believes that bore holes should be geophysically logged to characterize site physical features as specified by EPA Guidance, See Comment to Section 3.4. If sitewide bore holes are adequate, this may not be necessary. Please address this issue.)

Section 4.1.1: Regarding the second paragraph on page 34, the radiation survey grid spacing "will" (not may) be reduced when hot spots are detected. Show the planned sample points on an appropriate map.

Also, devise a plan to locate survey stations directly in all known runoff channels. It is unlikely that a grid would adequately target these very narrow and shallow channels where radionuclides, or other metals, may have collected in sediments.

The instrument/probe combinations discussed on pages 34 and 35 and the walkover survey performance conditions discussed on page 35 and 36 appear to be more appropriate to a SOP or a SOPA rather than inclusion in the body of the text. Please reference the appropriate SOP or prepare a SOP addendum if needed.

Section 4.1.2: This section should provide the decision process for terminating the bore holes. For example, will they drill and sample below the saturated zone? What will occur if a perched water tables is suspected? Will they be completed in alluvium, bedrock or both. Give as much guidance to field personnel as possible.

Moisture in the Rocky Flats Alluvium needs to be assessed, for this Phase 1 activity, down to the water table. Neutron moisture probes

may be more efficient that multiple geotechnical samplers. Or it may be appropriate to add soil moisture tests at ten foot intervals (ASTM D2216).

Section 4.1.3: It is stated that monitoring wells will be completed in the "shallow alluvial ground water". How will the seasonality of alluvial water levels be factored into well completion to assure year-round monitoring. * See Rand

The plan needs to include a vadose sampling and monitoring effort. The cone penetrometer and BAT methods planned for OU-7 may be appropriate to the unconsolidated alluvium and should be considered.

The West Spray Field is under a RCRA Alternate Monitoring Plan, the adequacy of which has been questioned on previous occasions by the Division. DOE should consider whether this would be an appropriate time to address concerns about down gradient wells in bedrock. (Please contact Caren Johannes @ 331-4874 for details.)

Section 4.1.1: Provide, for the benefit of field personnel, an illustration of the 25 subsample sites on Figure 4-1 or other appropriate figure. Also, explain how the 25 subsamples are composited to 9 samples or reference the appropriate SOP or SOPA.

Section 4.2: A more detailed discussion of the sample handling procedures and analytical program, including sample designations, analytical requirements, sample containers and preservation, and sample handling and documentation, is needed (see OU-7 RFI/RI).

Section 4.2.1: Section 4.1.3 does not discuss the CDH protocol nor is the description in Section 4.1.4 adequate. See comment to Section 4.1.1.

Also, any alternate "appropriate method" of soil sampling must be described.

Section 4.2.2.1: This section states that 1988-89 ITPH (Interceptor Trench Pump House) liquid sample data was being generated. Please determine if any new contaminants were found and, if so, please include them in the sampling parameters. (The Division concurs with DOE that post 1985 data from the ITPH is relevant in assessing the types of contaminants that may have been applied earlier to the spray field.) The Division assumes that TAL Metals, etc., will be proposed as a replacement for HSL constituents as appropriate.

Table 3-2: This table should be expanded comparable to Table 4-1 of the August 1991 OU-7 work plan.

Appendix F: The Background Geochemical Characterization Report, being subject to revision, should be referenced rather than placed

in an appendix.

Appendix I: The Baseline Risk Assessment and Environmental Evaluation work plans should be in the body of the text not in an appendix. Please state that risk will be determined "at the source" as specified in the IAG Statement of Work (Section I.B.11.b, page 14).

The Division is concerned that the Baseline Risk Assessment Plans currently being submitted by DOE are generic restatements of regulation and guidance **and** do not reflect site specific needs nor demonstrate how RFI/RI data will be sufficient to reliably calculate the risks associated with various contaminants. Please include a discussion of site specific issues and how data requirements specific to risk assessment are being met.